PERFORMANCE COMPARISON BETWEEN PLANING MONOHULL AND CATAMARAN AT HIGH FROUDE NUMBERS

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ABSTRACT

Conventional ships have been used for many years with a usual body forms. But the recent developments in the high speed crafts have created many different alternatives. Therefore the selection of hull type becomes an important issue in preliminary design stage. This selection should be based on performance comparisons and also other parameters such as building cost and so on. Since planing monohulls and catamarans are very popular type of high speed crafts, in this paper their behaviors from resistance at high speed point of view are compared. The results may be very useful for designers at conceptual or preliminary design stages.

KEY WORDS: High speed crafts, Planing monohull, Planing catamaran.

NOMENCLATURE:

\[ F_{nV} \] - Froude number- \( F_{nV} = \frac{V}{\sqrt{g\cdot \nabla^{1/3}}} \)  \( \tau \) - Trim angle

\[ g \] - Gravity acceleration  \( R_p \) - Pressure resistance

\[ V \] - Speed of the vessel  \( \Delta \) - Displacement

\[ \nabla \] - Volumetric displacement of vessel  \( R \) - Total resistance

\[ R_f \] - Frictional resistance  LCG - Longitudinal position center of gravity

\[ \rho \] - Water density  VCG - Vertical position center of gravity

\[ V_m \] - Speed of the water relative to the hull  \( f \) - Distance between thrust and center of gravity

\[ \lambda \] - Length to beam ratio  \( \varepsilon \) - Angle between thrust and keel

\[ \bar{B} \] - Mean breath of vessel  \( \bar{B}_1 \) - Mean breath of two demihulls

\[ C_F \] - Total frictional coefficient  \( W \) - Weight of Vessel

\[ \beta \] - Deadrise angle  \( S \) - Total wetted surface